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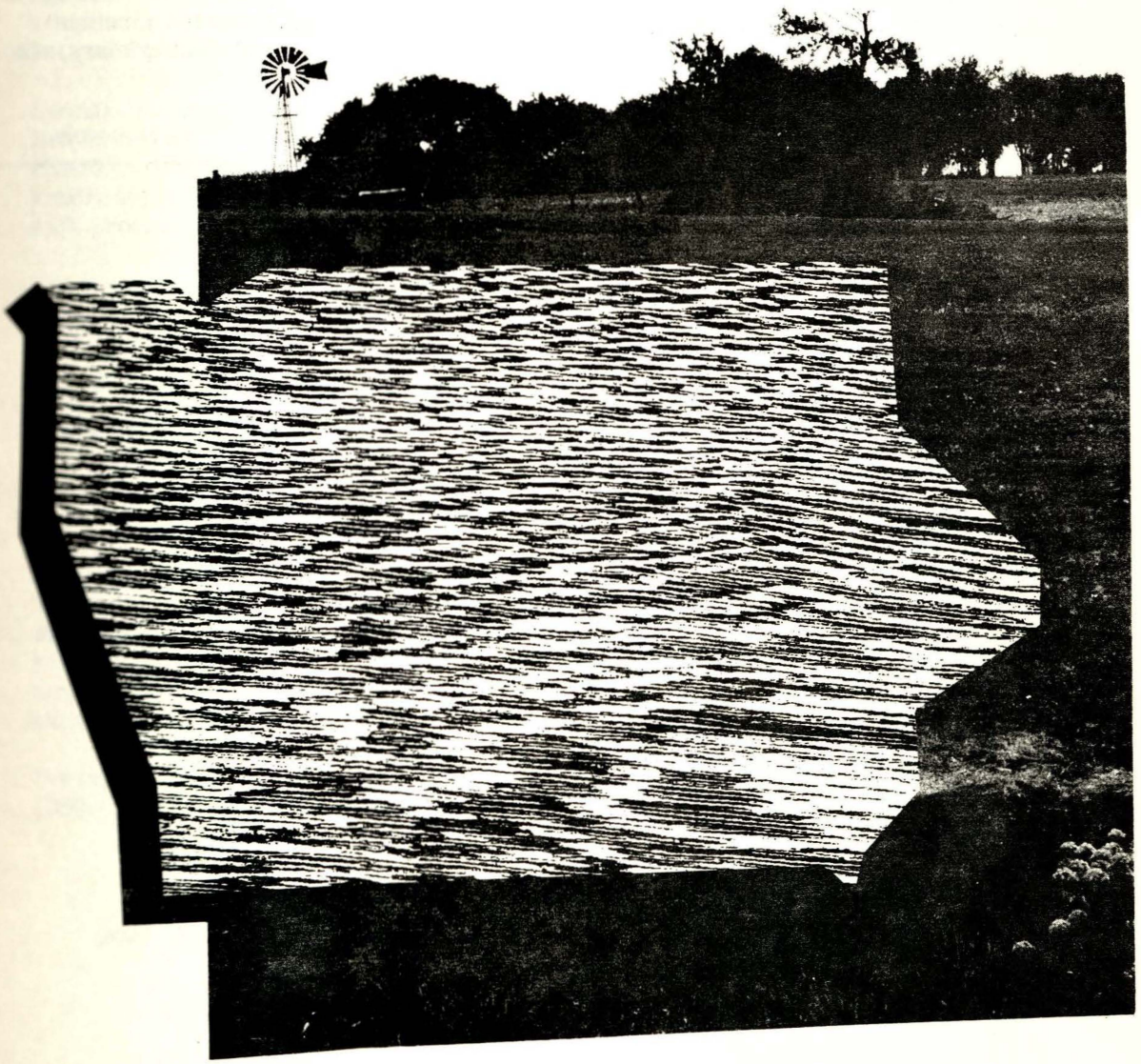
Forest
Service

North Central
Forest Experiment
Station

Resource
Bulletin NC-126

The Timber Industry of Iowa —An Assessment of Timber Product Output and Use, 1988

W. Brad Smith and John Tibben



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KEY WORDS: Saw logs, sawmills, mill residue, timber removals.

North Central Forest Experiment Station
Forest Service—U.S. Department of Agriculture
1992 Folwell Avenue
St. Paul, Minnesota 55108
Manuscript approved for publication December 14, 1990
1990

FOREWORD

This bulletin discusses recent Iowa forest industry trends and contains the results of a detailed study of forest industry, industrial roundwood production, and associated primary mill wood and bark residue in Iowa in 1988. Additional information on residential fuelwood and post production based on trends from recent studies in the Central States is also presented. Such detailed information is necessary for intelligent planning and decisionmaking in wood procurement, forest resource management, and forest industry development. Likewise, researchers need current forest industry and industrial roundwood information for planning projects.

Special thanks are given to the primary wood-using firms that supplied information for this study and to the Iowa Department of Natural Resources (IDNR) foresters who canvassed these respondents. Their cooperation is greatly appreciated. A directory listing the names and addresses of active mills processing forest products in Iowa is available by contacting:

Forestry Extension
Iowa State University
Ames, Iowa 50011

All references to red oak in this paper are for the red oak group which includes black oak as well as northern red oak, shingle oak, northern pin, and pin oak. Similarly, all references to white oak are for the white oak group which includes white oak, swamp white oak, bur oak, chinkapin oak, chestnut oak, overcup oak, and post oak.

All board foot data in this report have been converted to International 1/4-inch scale by applying a multiplier of 1.38 to all saw log volumes reported by sawmills in Doyle scale and a multiplier of 1.14 to all veneer log volumes reported in Doyle scale by veneer mills. To convert to Doyle log scale, multiply the International scale volume for saw logs by 0.7246 and multiply the International scale volume for veneer logs by 0.8772.

The last study of industrial roundwood output in Iowa was conducted in 1980. Data in this report are compared with the 1980 study results.

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The Timber Industry of Iowa: An Assessment of Timber Product Output and Use, 1988

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HIGHLIGHTS

- Total industrial and non-industrial roundwood production rose 29 percent between 1980 and 1988 to 43.5 million cubic feet. Fuelwood accounts for 70 percent (30.9 million cubic feet) of current roundwood production.

- Industrial roundwood production dropped 5 percent between 1980 and 1988 to 12.6 million cubic feet. Leading species cut for industrial roundwood were red oak, white oak, and cottonwood. Together they accounted for more than two-thirds of the industrial roundwood cut in 1988.

- The Northeast Unit supplied 56 percent of all industrial roundwood.

- Saw log production, 86 percent of industrial roundwood, was 64.6 million board feet in 1988. Major harvest species for saw logs in 1988 were red oak (33 percent), white oak (17 percent), and cottonwood (23 percent).

- Losses to Dutch elm disease during the 1970's saw elm saw log production peak just above 5 million board feet in 1972. By 1980 the volume of elm harvest fell to 0.5 million board feet then rebounded slightly to 1.1 million board feet in 1988.

- Saw log exports from Iowa to other States fell from 8.4 million board feet in 1980 to 4.8 million board feet in 1988.

- Iowa sawmills were more dependent on other States for their log requirements in 1988 than in 1980. Total log receipts at Iowa sawmills were 81.6 million board feet in 1988. Nearly 22 million board feet of these saw logs came from out of state in 1988 compared to 8 million board feet in 1980.

- Great progress has been made since 1972 in finding markets for primary wood-using mill residue. Currently less than 17 percent of all coarse and fine residues are unused.

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John Tibben, Utilization Forester, received a B.S. degree in forestry (1969) from the University of Arkansas at Monticello. After working for the State of Arkansas for 2-1/2 years he joined the Iowa DNR staff and has been the State Utilization Forester for the past 9 years.

PRIMARY FOREST INDUSTRY - INDUSTRIAL ROUNDWOOD

Sawmills dominate the active (operating) primary wood-using mill population in Iowa. Out of the 67 mills reporting in 1988, 65 were sawmills. Most of these mills are in the eastern portion of the State (fig. 1).

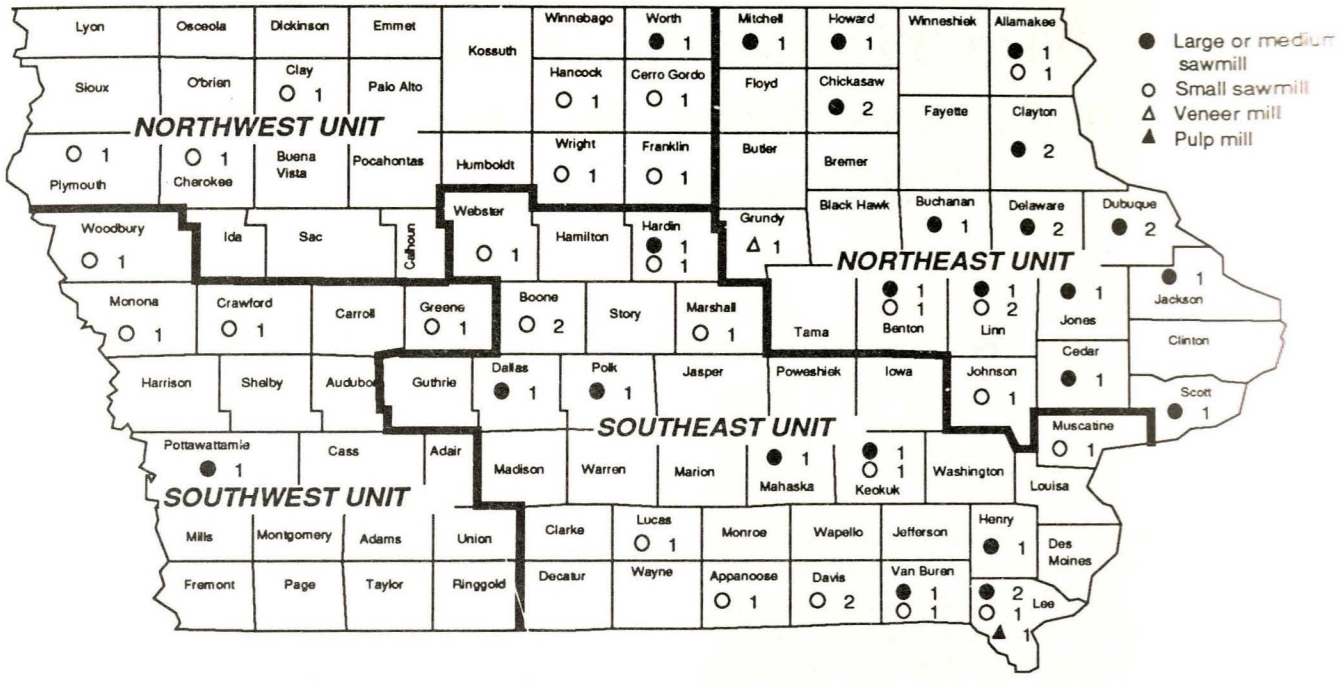

Figure 1.—*Forest Survey Units in Iowa and number of mills by type and county reporting for this study.*

Average annual lumber output per sawmill has remained steady at about 1.0 million board feet since 1972. Surviving and new sawmills tend to be larger, better managed, and more financially sound than their predecessors. Iowa is dotted with small mills however, and of the 35 mills classed as smaller than 1 million board feet of production annually, nearly two-thirds have annual production less than 200 thousand board feet. Many of these do specialty sawing and some do not operate year round.

Industrial roundwood production in 1988 was 5 percent lower than in 1980. The only area posting an increase was the Southeast Unit (fig. 2).

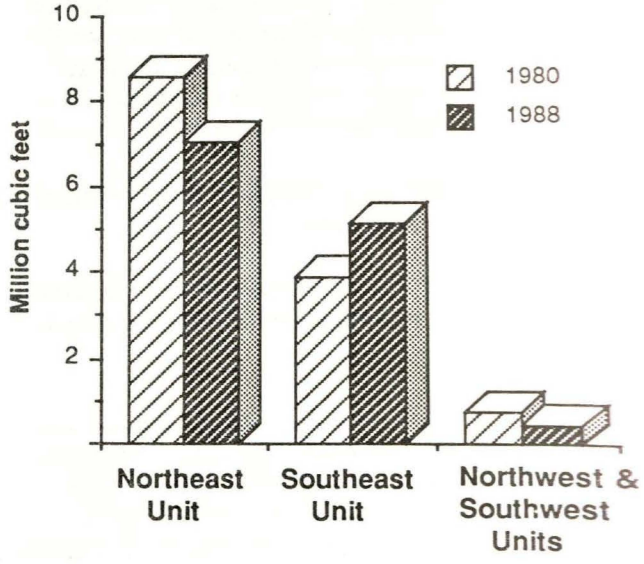

Figure 2.—*Industrial roundwood production in Iowa, 1980 and 1988.*

The Northeastern Units' share of industrial roundwood production declined from 65 percent in 1980 to 56 percent in 1988.

Principal species cut for industrial use were red oak (32 percent), white oak (16 percent), and cottonwood (22 percent). Other important species included soft maple, hard maple, basswood, walnut, and ash.

TIMBER REMOVALS FOR INDUSTRIAL ROUNDWOOD

Estimated timber removals from growing stock on timberland for industrial roundwood were 13.6 million cubic feet. An additional 1 million cubic feet were removed for fuelwood and post production. The bulk of fuelwood and post production comes from nongrowing-stock and non-timberland sources. Sawtimber removals on timberland were 55.0 million board feet in 1988, down 11 percent from 61.8 million cubic feet in 1980. Most of the decline was found in two species groups—white oak and black walnut.

SAW LOGS

Saw logs constituted 86 percent of all industrial roundwood harvested in 1988. Loggers cut 64.6 million board feet of saw logs in Iowa, up 2 percent from 1980. Principal species harvested were red oak, white oak, and cottonwood; together they comprised more than two-thirds of the harvest.

Most species have kept pace with removal levels of 1980 (fig. 3). Large increases occurred in red oak (4.9 million board feet) and cottonwood (1.7 million board feet). Notable declines were reported for elm (1.7 million board feet), white oak (1.4 million board feet), and black walnut (1.4 million board feet).

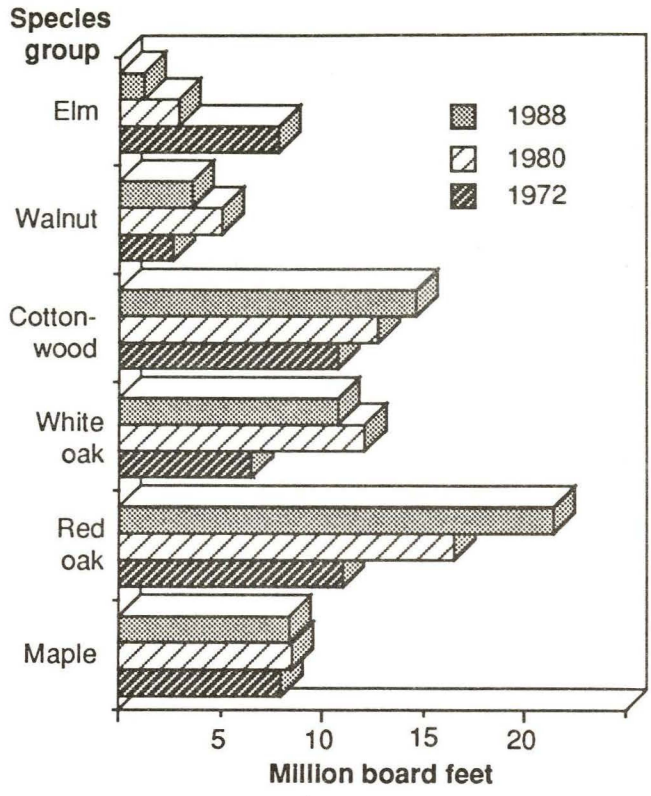

Figure 3.—*Saw log production by selected species groups in Iowa for 1972, 1980, and 1988.*

During 1980, 8.4 million board feet of saw logs, mostly walnut and oak, were shipped to other States; Wisconsin, Minnesota, and Indiana were the primary recipients. In 1988, exports fell to 4.8 million board feet, 3.3 million board feet of which were shipped to Wisconsin. Primary exports in 1988 were oak, hard maple, cottonwood, basswood, and ash.

Loggers cut 55 percent of the saw log volume in the Northeast Unit, including more than two-thirds of the elm, hard maple, birch, red oak, basswood, black cherry, willow, and aspen. Forty-one percent of the total saw log volume was cut in the Southeast Unit, including nearly half of the cottonwood, soft maple, and hackberry.

The western Units provided only 16 percent of the saw log harvest but an important 10 percent of the cottonwood (1.5 million board feet).

During 1980, Iowa sawmills received 81.6 million board feet of logs. Iowa was considerably less self-sufficient in supplying logs to its sawmills in 1988 than in 1980. Iowa sawmills imported 27 percent (21.9 million board feet) of their log requirements in 1988 compared with 12 percent (7.9 million board feet) in 1980. Illinois was the chief source of imports in 1988 with 8.0 million board feet. Minnesota and Wisconsin supplied nearly 5 million board feet each in 1988. Northeast Unit mills with easy access to more forested neighbor states were most dependent on imports, processing nearly two-thirds of the logs received from other states. Red oak, cottonwood, and white oak were the principal imports.

VENEER

The veneer log figures contained in this report reflect only those logs that were received by mills in the U.S. or Canada and do not include logs exported overseas. In recent years the volume of overseas exports has risen dramatically. Foreign export data indicate that seven major Iowa exporters shipped over 1.5 million board feet of hardwood logs overseas in 1988. Many of these logs came from Iowa forests. Although it is difficult to determine the volume that came from Iowa it is certain that it has had an impact and that some production has shifted from domestic to foreign markets.

Production of Iowa veneer logs for domestic and Canadian markets have declined in recent years for nearly all major species (fig. 4). Oak and walnut showed the greatest declines since 1980 with losses of 1 million and 711 thousand board feet respectively. A bright spot has been the increase of 548 thousand board feet for soft maple.

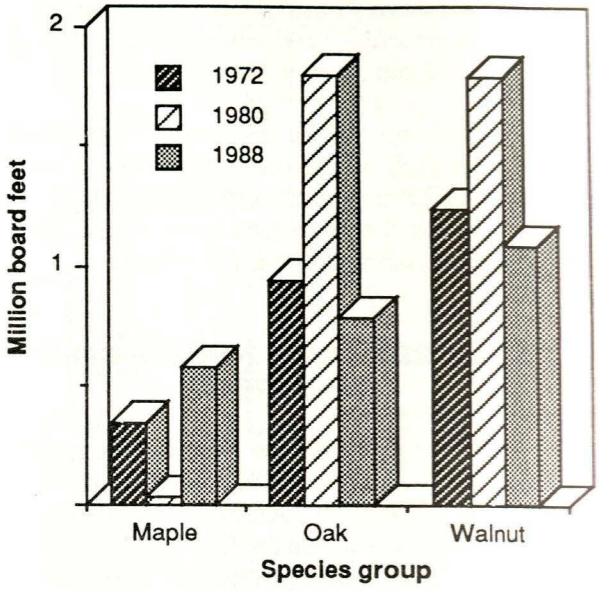

Figure 4.—*Veneer log production by selected species groups in Iowa, 1972, 1980, and 1988.*

PULPWOOD

Pulpwood production declined from 16.8 thousand cords in 1980 to 15.6 thousand cords in 1988. Overall, however, harvesting for pulp has fared much better than some of the other products in Iowa since 1980 showing only a 7 percent decline compared to a 29 percent decline for veneer and the elimination of cooperage production completely.

OTHER PRODUCTS

Post production continues to decline as demand for fencing follows livestock trends downward. Post production in Iowa was estimated at 353 thousand pieces in 1988 based on trends from recent studies in Illinois and Missouri.

Residential fuelwood production is estimated to be up since 1980 to a current level of 449 thousand cords. However, only 3 percent of removals for fuelwood come from growing-stock trees on timberland (fig. 5).

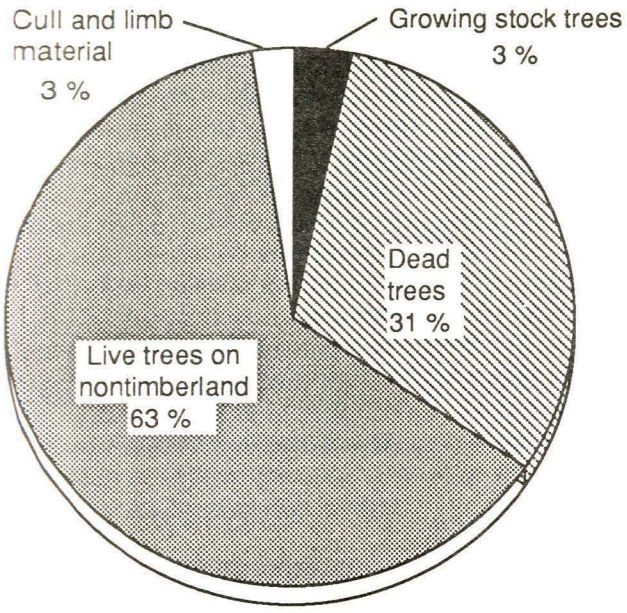

Figure 5.—*Sources of residential fuelwood in Iowa, 1988.*

LOGGING RESIDUE

Based on data from logging utilization studies it is estimated that 52 percent of logging residues are usable limbwood (fig. 6). Thirty percent of the residues generated are unused portions of the saw log section of sawtimber size trees.

PRIMARY MILL RESIDUE

During 1988, Iowa's primary wood-using mills (except pulpmills) generated 110 thousand green tons of coarse residue, 62 thousand green tons of fine residue, and 47 thousand green tons of bark. Coarse residue is wood suitable for chipping such as slabs, edgings, and veneer cores. The Northeast Unit produced the highest concentration of residue accounting for nearly 60 percent of the total in each category.

A comparison by residue class of the percentage used that was generated in 1972 with the same percentage in 1980 shows excellent progress has been made in finding uses for all residues (fig. 7).

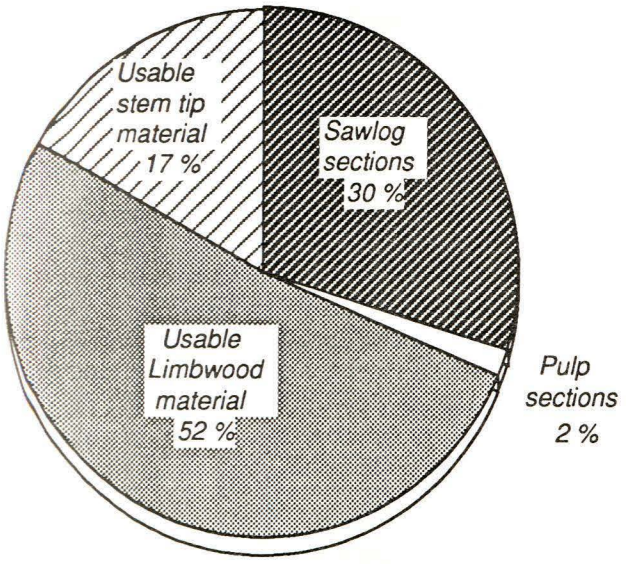

Figure 6.—*Distribution of logging residues by type of material in Iowa, 1988.*

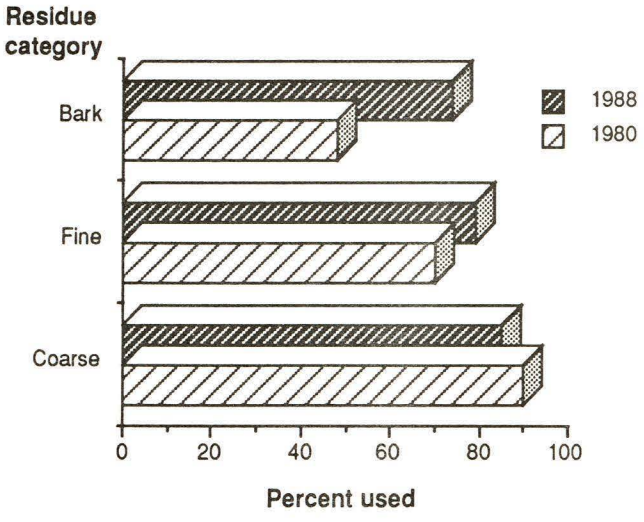

Figure 7.—*Percent of mill residues used by category, 1980 and 1988.*

The major use of mill residues in 1988, consuming 47 percent (103 thousand green tons), was livestock bedding, poultry litter, mulch, and similar products. Other markets included 42 thousand green tons (19 percent) for domestic (household) fuelwood and 21 thousand green tons (10 percent) for pulp or fiber products.

Unused residue is most likely to be found at smaller mills and some medium-sized mills where residue storage may not be a problem and the volume available may be insufficient to attract customers requiring large quantities. Unused residue is often piled, used for landfill, or burned as waste.

OUTLOOK

When economic activity turns up, demand of Iowa industrial roundwood should grow, especially for saw logs. As the economy grows, demand for wood pallets, crating, railroad ties, replacement furniture, and home remodeling supplies generally increases. The new housing market is currently sagging but is expected to make a modest upturn through the early 90's. This increased demand for housing should translate into a rise in production, particularly if the farm economy improves. Sawmills will continue to dominate Iowa's forest industry. Overall demand for Iowa saw logs might be expected to rise 2-4 percent annually during the next decade. Average sawmill size is likely to increase as the number of active sawmills may be nearing a period of stability. As small mills drop out of production they will be replaced by others or by increased capacity of existing mills.

Market outlets for residues should continue to be strong. If new markets continue to develop, more than 90 percent of all residue may be used by the year 2000.

APPENDIX

STUDY METHODS

Data for this publication came from canvassing (with the formal questionnaire shown on the following pages) all of the known primary wood-using mills that use Iowa logs and bolts. The study was a cooperative effort between the Iowa Department of Natural Resources (IDNR) and the North Central Forest Experiment Station (NCFES). IDNR foresters personally canvassed all of the known Iowa primary mills (except one pulpmill). IDNR utilization and marketing specialists provided estimates based on prior knowledge and contacts for Iowa mills that did not furnish complete data.

The NCFES mailed a similar questionnaire to the Iowa pulpmill and all out-of-State mills using Iowa roundwood. Follow-up on nonrespondents was by mail and telephone.

Logging utilization factors were used to estimate the logging residue. These factors were determined from an Illinois logging utilization study conducted during 1984-1985 and a Missouri logging utilization study conducted during 1986-1987 by the NCFES .

The NCFES edited and compiled the data.

Residential fuelwood and post statistics were developed for Iowa based on data from the Bureau of the Census 1980 population figures, preliminary species volume distribution data from the new Iowa survey, and individual species preferences and harvesting patterns from recent fuelwood studies in Illinois (1983) and Missouri (1987). Harvest patterns for areas of similar population density were used to establish base levels of total fuelwood harvest. Species preferences derived from the Missouri and Illinois studies were mapped onto current inventory data to develop fuelwood harvest distributions by species for Iowa. A similar process was used to estimate post production.

SAMPLING ERROR

Because all primary wood-using mills were canvassed, there is no sampling error for the roundwood products they used or the wood and bark residue they generated. Fuelwood and post data are estimated to have an error of about ±15 percent at the state total level.

Form Approved
OMB No. 0596-0010

LOGS AND OTHER WOOD PROCESSED IN 1988

IOWA

This form is for reporting the quantities and kinds of logs and other wood processed by this plant in 1988, and the disposition of the wood residues resulting from this operation.

All replies will be held confidential and used only for statistical reports.

☐ Check here if you wish to receive a copy of the report resulting from this study.

Plant or company name: _____

Mailing address: _____

Plant location: _____

Person to contact about this report: _____

Types of wood processed in 1988. *Check only one kind of product. If more than one kind was received, fill out a separate form for each.*

14-15

01	☐	Saw logs & bolts-- includes veneer logs sawn
02	☐	Veneer logs & bolts cut into veneer
03	☐	Cooperage logs and bolts
04	☐	Handle bolts
06	☐	Piling
07	☐	Poles
10	☐	Posts
11	☐	Charcoal wood
12	☐	Other (specify) _____

☐ Check here if no wood was processed in 1988 and return the form.

Total volume of above-checked product that was processed in 1988.

Conifer (pine, cedar, etc.) _____ (27-36) Hardwood (includes cottonwood) _____ (37-46)

THIS BLOCK FOR OFFICE USE ONLY

Cols. 1-5 = **61100**

MILL	STATE	COUNTY	FACTOR	MILL SIZE
XXX	XX	XXX	XXX	X
6-8	9-10	11-13	47-49	50

A pre-addressed stamped envelope is provided for your convenience.

This survey is authorized by PL 93-378 as amended by PL 94-588. Your cooperation is appreciated and needed to make the results of this survey comprehensive, accurate, and timely, although you are not required to respond.

LOGS and OTHER WOOD PROCESSED IN 1988.

Do not include logs or bolts sold or transferred to other companies. Enter quantity processed opposite species in appropriate columns showing survey units, other states and Canada where the logs and bolts were harvested. The State map on page 4 shows unit boundaries. If the unit of measure is board feet, indicate the log rule or lumber tally. ☐ Doyle ☐ International ☐ Scribner ☐ Lumber tally
If cords, specify size _____. If weight, specify pounds per thousand board feet _____ or pounds per cord _____.

Cols. 1-5 = 612xx or 613xx

Species	Unit of measure: Board feet ☐ Cords ☐ Cubic feet ☐ Lineal feet ☐ Piecies ☐ Weight ☐ Other ☐ _____		FROM IOWA - ENTER NAME OF UNIT IMMEDIATELY BELOW								OTHER STATES AND CANADA	
			NORTH-EAST	SOUTH-EAST	SOUTH-WEST	NORTH-WEST						
			XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
			19100	19200	19300	19400						
Pine, Red	1											
Pine, White	2											
Redcedar	3											
Ash	4											
Aspen	5											
Basswood	6											
Birch	7											
Cherry, Black	8											
Cottonwood	9											
Elm	10											
Hackberry	11											
Hickory, Pecan	12											
Maple, Hard	13											
Maple, Soft	14											
Oak, Red	15											
Oak, White	16											
Walnut, Black	17											
Willow	18											
Other (specify)	19											
TOTAL												

DISPOSAL OF PLANT RESIDUES IN 1988 BY TYPE AND USE, for product checked on page 1

Instructions: Please enter your best estimate of the **percentage of each type of plant residue** that was used for the various purposes indicated

Cols. 1-5 = 615xx

DISPOSAL OF RESIDUE	BARK		COARSE RESIDUES (Suitable for chipping such as slabs, edgings, etc.)		FINE RESIDUES (Sawdust, veneer, clippings, etc. not suitable for chipping)	
	1 Conifer	2 Hardwood	3 Conifer	4 Hardwood	5 Conifer	6 Hardwood
	XX	XX	XX	XX	XX	XX
1. USED FOR:						
a. Manufacture of fiber products such as pulp, hardboard, or roofing felt 1	%	%	%	%	%	%
b. Charcoal or chemical wood 2	%	%	%	%	%	%
c. Industrial fuel at this or other mill 3	%	%	%	%	%	%
d. Domestic household fuel -- sold or given away 4	%	%	%	%	%	%
e. Miscellaneous uses such as livestock bedding, mulch, small dimension, and specialty items. 5	%	%	%	%	%	%
2. NOT USED: (Including land fill and residues burned as waste. 6	%	%	%	%	%	%
3. TOTAL	%	%	%	%	%	%

post data are estimated to have an error of about ±15 percent at the state total level.

DEFINITION OF TERMS

Coarse mill residue.—Wood residue suitable for chipping such as slabs, edgings, and veneer cores.

Consumption.—The quantity of a commodity, such as saw logs, utilized.

Fine mill residue.—Wood residue not suitable for chipping such as sawdust and veneer clippings.

Forest industry land.—Land owned by companies or individuals operating primary wood-using mills.

Forest Survey Unit.—A geographic area (group of counties) used by the Forest Inventory and Analysis Project to report periodic inventories and use of the Nation's forest resources.

Industrial roundwood products.—Saw logs, pulpwood, veneer logs, poles, commercial posts, piling, cooperage logs, particleboard bolts, shaving bolts, lath bolts, charcoal bolts, and chips from roundwood used for pulp or board products.

Industrial roundwood production.—The quantity of industrial roundwood harvested in a geographic area.

Industrial roundwood receipts.—The quantity of industrial roundwood received in a geographic area regardless of the geographic source.

Logging residue.—The unused portions of trees cut or killed by logging.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land under the administration of the USDA Forest Service.

Primary wood-using mills.—Mills receiving roundwood or chips from roundwood for processing into products.

Primary wood-using mill residue.—Wood materials (coarse and fine) and bark generated at manufacturing plants from roundwood processed into principal products. These residues include wood products (by-products) obtained incidental to production of principal products and wood materials not utilized for some product.

Roundwood.—Logs, bolts, or other round sections cut from trees (including chips from roundwood).

Standard cord.—A stack of wood bolts (or the equivalent) encompassing 128 cubic feet of wood, bark, and air space. A cord of pulpwood contains 79 cubic feet of wood and 49 cubic feet of bark and air space.

State land.—Land owned by States or land leased to these governmental units for 50 years or more.

Timberland.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Generally, this includes areas suitable for growing crops of industrial wood in excess of 20 cubic feet per acre annually.

COMMON AND SCIENTIFIC NAMES OF TREE SPECIES MENTIONED

SOFTWOODS
Eastern white pine ..... *Pinus strobus*
Red pine ..... *Pinus resinosa*
Eastern redcedar ..... *Juniperus virginiana*
HARDWOODS
Ash
White ash ..... *Fraxinus americana*
Black ash ..... *Fraxinus nigra*
Green ash ..... *Fraxinus pennsylvanica*
Aspen
Bigtooth aspen ..... *Populus grandidentata*
Quaking aspen ..... *Populus tremuloides*
American basswood ..... *Tilia americana*
Birch
River birch ..... *Betula nigra*

Cottonwood ..... *Populus deltoides*
Elm
American elm ..... *Ulmus americana*
Slippery elm ..... *Ulmus rubra*
Rock elm ..... *Ulmus thomasii*
Hackberry ..... *Celtis occidentalis*
Hickory
Mockernut hickory ..... *Carya tomentosa*
Shagbark hickory ..... *Carya ovata*
Shellbark hickory ..... *Carya laciniosa*
Bitternut hickory ..... *Carya cordiformis*
Hard maple
Sugar maple ..... *Acer saccharum*
Black maple ..... *Acer nigrum*
Soft maple
Silver maple ..... *Acer saccharinum*
Red oak
Northern red oak ..... *Quercus rubra*
Northern pin oak ..... *Quercus ellipsoidalis*
Black oak ..... *Quercus velutina*
Shingle oak ..... *Quercus imbricaria*
Pin oak ..... *Quercus palustris*
White oak
White oak ..... *Quercus alba*
Swamp white oak ..... *Quercus bicolor*
Bur oak ..... *Quercus macrocarpa*
Chinkapin oak ..... *Quercus muehlenbergii*
Overcup oak ..... *Quercus lyrata*
Post oak ..... *Quercus stellata*
Black walnut ..... *Juglans nigra*
Black willow ..... *Salix nigra*
Other hardwoods
Honeylocust ..... *Gleditsia triacanthos*
Kentucky coffeetree ..... *Gymnocladus dioicus*
American sycamore ..... *Platanus occidentalis*
Butternut ..... *Juglans cinerea*
Osage-orange ..... *Maclura pomifera*
Black locust ..... *Robinia pseudoacacia*
Red mulberry ..... *Morus rubra*
Boxelder ..... *Acer negundo*

TABLE TITLES

Table 1.—Number of active primary wood-using plants in Iowa, 1972, 1980, and 1988

Table 2.—Roundwood production by type of product and species group in Iowa, 1972, 1980, and 1988

Table 3.—Saw log production by species group in Iowa, 1972, 1980, and 1988

Table 4.—Veneer log production by species group in Iowa, 1972, 1980, and 1988

Table 5.—Pulpwood production by species group in Iowa, 1972, 1980, and 1988

Table 6.—Industrial and non-industrial roundwood production by Forest Survey Unit, species group, and product, Iowa, 1988

Table 7.—Timber removals from growing stock on timberland for industrial roundwood by species group and Forest Survey Unit, Iowa, 1988

Table 8.—Timber removals from growing stock on timberland for fuelwood and posts by species group and Forest Survey Unit, Iowa, 1988

Table 9.—Timber removals from sawtimber on timberland for industrial roundwood by species group and Forest Survey Unit, Iowa, 1988

Table 10.—Saw log production by species group and State of destination, Iowa, 1988

Table 11.—Saw log receipts in Iowa by species group, area of origin, and Forest Survey Unit, 1988

Table 12.—Lumber production by Forest Survey Unit for softwoods and hardwoods, Iowa, 1988

Table 13.—Veneer log production by species group and State of destination, Iowa, 1988

Table 14.—Post production by species group and Forest Survey Unit, Iowa, 1988

Table 15.—Logging residue by species group and Forest Survey Unit, Iowa, 1988

Table 16.—Residue produced at primary wood-using mills by type of material, by type of use, and Forest Survey Unit, Iowa, 1988

Table 1.--Number of active primary wood-using plants in Iowa, 1972, 1980, and 1988

Kind of plant	1972	1980	1988
Sawmills			
Large 1/	--	2	3
Medium 2/	48	20	27
Small 3/	12	19	35
Total	60	41	65
Cooperage mills	1	1	--
Veneer mills	2	1	1
Pulpmills	2	2	1
All mills	65	45	67

1/ Annual lumber production in excess of 5 million board feet.

2/ Annual lumber production from 1 million to 5 million board feet.

3/ Annual lumber production less than 1 million board feet.

Table 2.-- Roundwood production by type of product and species group in Iowa, 1972, 1980, and 1988

(In thousand cubic feet)

	Softwoods			Hardwoods			All species		
Product	1972	1980	1988	1972	1980	1988	1972	1980	1988
Sawlogs	17	0	3	8,987	10,621	10,816	9,004	10,621	10,819
Cooperage logs	--	--	--	102	558	0	102	558	0
Veneer logs	--	--	--	1,157	712	522	1,157	712	522
Pulpwood	--	--	--	2,441	1,320	1,225	2,441	1,320	1,225
Miscellaneous 1/	--	--	--	232	0	0	232	--	--
Total industrial	17	0	3	12,919	13,211	12,563	12,936	13,211	12,566
Posts 2/	0	15	34	185	140	68	185	155	102
Fuelwood 2/	0	15	43	9,757	20,300	30,823	9,757	20,315	30,866
Total all products	17	30	80	22,861	33,651	43,454	22,878	33,681	43,534

1/ Includes plants producing shavings, chips, etc.

2/ Data for 1980 and 1988 are estimates based on trend data and related studies.

Table 3.-- Saw log production by species group in Iowa, 1972, 1980, and 1988

(In thousand board feet) 1/

Species group	1972	1980	1988	Change 1980-88
SOFTWOODS				
Red pine	2	--	4	4
White pine	103	--	4	4
Redcedar	--	3	10	7
Total	105	3	18	15
HARDWOODS				
Ash	1,649	1,636	1,867	231
Aspen	188	305	24	-281
Basswood	2,205	2,185	1,724	-461
Birch	472	152	10	-142
Black cherry	113	132	252	120
Cottonwood	10,774	12,831	14,582	1,751
Elm	7,808	2,866	1,144	-1,722
Hackberry	568	498	284	-214
Hickory	783	447	432	-15
Hard maple	1,568	3,367	3,275	-92
Soft maple	6,474	5,089	5,077	-12
Red oak	11,079	16,470	21,394	4,924
White oak	6,508	12,118	10,743	-1,375
Black walnut	2,669	5,025	3,649	-1,376
Willow	438	233	7	-226
Other hardwoods	93	118	83	-35
Total	53,389	63,472	64,547	1,075
All species	53,494	63,475	64,565	1,090

1/ International 1/4-inch rule

Table 4.-- Veneer log production by species group in Iowa, 1972, 1980, and 1988

(In thousand board feet) 1/

Species group	1972	1980	1988	Change 1980-88
Ash	111	57	--	-57
Basswood	252	84	208	124
Black cherry	--	--	3	3
Cottonwood	84	23	27	4
Elm	440	--	8	8
Hard maple	216	14	--	-14
Soft maple	122	24	572	548
Red oak	920	1,132	383	-749
White oak	19	672	405	-267
Black walnut	1,238	1,795	1,084	-711
Other hardwoods	613	--	10	10
All species	4,015	3,801	2,700	-1,101

1/ International 1/4-inch rule

Table 5.-- Pulpwood production by species group in Iowa, 1972, 1980, and 1988

(In standard cords, unpeeled) 1/

Species group	1972	1980	1988	Change 1980-88
Roundwood				
Softwoods	--	61	--	-61
Soft hardwoods	10,062	6,169	12,408	6,239
Hard hardwoods	20,837	10,554	3,239	-7,315
Total	30,899	16,784	15,647	-1,137
Residue 2/				
Softwoods	11,482	4,986	--	-4,986
Hardwoods	12,237	22,539	10,163	-12,376
Total	23,719	27,525	10,163	-17,362
All material	54,618	44,309	25,810	-18,499

Table 6.--Industial and non-industrial roundwood production by Forest Survey Unit, species group, and product, Iowa, 1988

ALL UNITS

Species group	Saw logs		Veneer logs		Pulpwood		All industrial roundwood	Fuelwood		Posts		All products
	MBF 1/	*MCF 2/*	*MBF 1/*	*MCF 2/*	*Cords 3/*	*MCF 2/*	**MCF 2/**	*Cords 3/*	*MCF 2/*	*Thousand peices*	*MCF 2/*	**MCF 2/**
SOFTWOODS												
Red pine	4	1	--	--	--	--	**1**	--	--	--	--	**1**
White pine	4	1	--	--	--	--	**1**	--	--	--	--	**1**
Redcedar	10	1	--	--	--	--	**1**	827	43	90	34	**78**
Total	18	3	--	--	--	--	**3**	827	43	90	34	**80**
												0
HARDWOODS												**0**
Ash	1,867	300	--	--	667	50	**350**	10,500	680	--	--	**1,030**
Aspen	24	4	10	2	--	--	**6**	--	--	--	--	**6**
Basswood	1,724	277	208	47	--	--	**324**	612	26	--	--	**350**
Birch	10	1	--	--	--	--	**1**	12,185	839	--	--	**840**
Black cherry	252	37	3	1	--	--	**38**	3,736	229	--	--	**267**
Cottonwood	14,582	2,052	27	6	8,313	657	**2,715**	20,167	1,373	--	--	**4,088**
Elm	1,144	180	8	2	--	--	**182**	47,882	3,296	--	--	**3,478**
Hackberry	284	42	--	--	--	--	**42**	3,716	244	--	--	**286**
Hickory	432	62	--	--	648	50	**112**	29,330	1,998	63	11	**2,121**
Hard maple	3,275	534	--	--	304	21	**555**	5,238	342	--	--	**897**
Soft maple	5,077	824	572	131	3,202	252	**1,207**	56,253	3,872	--	--	**5,079**
Red oak	21,394	3,796	383	88	972	75	**3,959**	66,317	4,580	54	10	**8,549**
White oak	10,743	1,896	405	92	648	50	**2,038**	167,591	11,675	136	47	**13,760**
Walnut	3,649	798	1,084	153	--	--	**951**	6,152	401	5	0	**1,352**
Willow	7	1	--	--	893	70	**71**	5,405	371	--	--	**442**
Other hardwoods	83	12	--	--	--	--	**12**	13,275	897	5	0	**909**
Total	64,547	10,816	2,700	522	15,647	1,225	**12,563**	448,359	30,823	263	68	**43,454**
All species	64,565	10,819	2,700	522	15,647	1,225	**12,566**	449,186	30,866	353	102	**43,534**

NORTHEAST UNIT

SOFTWOODS												
Red pine	4	1	--	--	--	--	**1**	--	--	--	--	**1**
White pine	4	1	--	--	--	--	**1**	--	--	--	--	**1**
Redcedar	2	0	--	--	--	--	**0**	166	6	18	6	**12**
Total	10	2	--	--	--	--	**2**	166	6	18	6	**14**
HARDWOODS												
Ash	1,018	164	--	--	--	--	**164**	2,789	184	--	--	**323**
Aspen	24	4	10	2	--	--	**6**	--	--	--	--	**6**
Basswood	1,478	238	208	47	--	--	**285**	395	23	--	--	**302**
Birch	7	1	--	--	--	--	**1**	8,549	589	--	--	**590**
Black cherry	214	31	--	--	--	--	**31**	2,408	154	--	--	**180**
Cottonwood	3,022	425	27	6	4,967	392	**823**	2,514	170	--	--	**713**
Elm	1,061	168	--	--	--	--	**168**	22,800	1,587	--	--	**1,745**
Hackberry	136	20	--	--	--	--	**20**	472	29	--	--	**48**
Hickory	260	38	--	--	--	--	**38**	6,982	482	22	6	**525**
Hard maple	3,181	521	--	--	--	--	**521**	4,408	293	--	--	**780**
Soft maple	1,669	272	572	131	1,860	146	**549**	13,627	941	--	--	**1,416**
Red oak	14,671	2,603	383	88	--	--	**2,691**	28,022	1,948	26	8	**4,339**
White oak	6,614	1,173	208	46	--	--	**1,219**	57,465	4,007	42	17	**5,001**
Walnut	1,876	411	438	63	--	--	**474**	2,465	161	3	0	**387**
Willow	6	1	--	--	587	46	**47**	1,222	86	--	--	**133**
Other hardwoods	--	--	--	--	--	--	**0**	2,790	191	1	0	**191**
Total	35,237	6,070	1,846	383	7,414	584	**7,037**	156,908	10,845	94	31	**16,679**
All species	35,247	6,072	1,846	383	7,414	584	**7,039**	157,074	10,851	112	37	**16,693**

(Table 6 continued on next page)

(Table 6 continued)

SOUTHEAST UNIT

Species group	Saw logs		Veneer logs		Pulpwood		All industrial roundwood	Fuelwood		Posts		All products
	MBF 1/	*MCF 2/*	*MBF 1/*	*MCF 2/*	*Cords 3/*	*MCF 2/*	***MCF 2/***	*Cords 3/*	*MCF 2/*	*Thousand peices*	*MCF 2/*	*MCF 2/*
SOFTWOODS												
Red pine	--	--	--	--	--	--	**0**	--	--	--	--	0
White pine	--	--	--	--	--	--	**0**	--	--	--	--	0
Redcedar	8	1	--	--	--	--	**1**	387	20	43	14	35
Total	8	1	--	--	--	--	**1**	387	20	43	14	35
HARDWOODS												
Ash	796	128	--	--	667	50	**178**	3,813	249	--	--	323
Aspen	0	0	--	--	--	--	**0**	--	--	--	--	0
Basswood	211	33	--	--	--	--	**33**	174	3	--	--	30
Birch	3	0	--	--	--	--	**0**	3,636	250	--	--	250
Black cherry	38	6	3	1	--	--	**7**	1,145	70	--	--	73
Cottonwood	9,692	1,365	--	--	3,346	265	**1,630**	3,919	264	--	--	871
Elm	83	12	8	2	--	--	**14**	7,776	527	--	--	534
Hackberry	144	21	--	--	--	--	**21**	2,580	174	--	--	193
Hickory	172	24	--	--	648	50	**74**	13,773	941	34	5	1,016
Hard maple	94	13	--	--	304	21	**34**	830	49	--	--	75
Soft maple	3,326	541	--	--	1,342	106	**647**	32,556	2,256	--	--	2,621
Red oak	6,596	1,172	--	--	972	75	**1,247**	32,259	2,238	28	2	2,916
White oak	4,108	720	197	46	648	50	**816**	55,619	3,875	76	28	4,306
Walnut	1,288	282	646	90	--	--	**372**	2,257	150	2	0	224
Willow	1	0	--	--	306	24	**24**	1,285	90	--	--	114
Other hardwoods	77	11	--	--	--	--	**11**	7,601	518	4	0	529
Total	26,629	4,328	854	139	8,233	641	**5,108**	169,223	11,654	144	35	14,077
All species	26,637	4,329	854	139	8,233	641	**5,109**	169,610	11,674	187	49	14,112

NORTHWEST AND SOUTHWEST UNIT

SOFTWOODS												
Red pine	--	--	--	--	--	--	**0**	--	--	--	--	--
White pine	--	--	--	--	--	--	**0**	--	--	--	--	--
Redcedar	--	--	--	--	--	--	**0**	274	17	29	14	31
Total	--	--	--	--	--	--	**0**	274	17	29	14	31
							0					
HARDWOODS												
Ash	53	8	--	--	--	--	**8**	3,898	247	--	--	247
Aspen	--	--	--	--	--	--	**0**	--	--	--	--	--
Basswood	35	6	--	--	--	--	**6**	43	--	--	--	6
Birch	--	--	--	--	--	--	**0**	--	--	--	--	--
Black cherry	--	--	--	--	--	--	**0**	183	5	--	--	5
Cottonwood	1,868	262	--	--	--	--	**262**	13,734	939	--	--	1,200
Elm	--	--	--	--	--	--	**0**	17,306	1,182	--	--	1,182
Hackberry	4	1	--	--	--	--	**1**	664	41	--	--	42
Hickory	--	--	--	--	--	--	**0**	8,575	575	7	--	575
Hard maple	--	--	--	--	--	--	**0**	--	--	--	--	--
Soft maple	82	11	--	--	--	--	**11**	10,070	675	--	--	685
Red oak	127	21	--	--	--	--	**21**	6,036	394	--	--	406
White oak	21	3	--	--	--	--	**3**	54,507	3,793	18	2	3,798
Walnut	485	105	--	--	--	--	**105**	1,430	90	--	--	90
Willow	--	--	--	--	--	--	**0**	2,898	195	--	--	195
Other hardwoods	6	1	--	--	--	--	**1**	2,884	188	--	--	189
Total	2,681	418	--	--	--	--	**418**	122,228	8,324	25	2	8,620
All species	2,681	418	--	--	--	--	**418**	122,502	8,341	54	16	8,651

1/ International 1/4-inch rule.

2/ Columns showing thousand cubic feet (MCF).

3/ Standard cords, unpeeled. A standard cord contains 128 gross cubic feet including wood, bark, and air space. Average solid wood is 79 cubic feet per standard cord.

Table 7.-- Timber removals from growing stock on timberland for industrial roundwood by species group and Forest Survey Unit, Iowa, 1988 1/

(In thousand cubic feet)

Species group	All Units	Northeast Unit	Southeast Unit	West 2/
SOFTWOODS				
Red pine	1	1	--	--
White pine	1	1	--	--
Redcedar	26	4	12	10
Total	28	6	12	10
HARDWOODS				
Ash	426	199	198	29
Aspen	6	6	--	--
Basswood	359	315	38	6
Birch	11	9	2	--
Black cherry	53	44	9	--
Cottonwood	2,722	746	1,654	322
Elm	340	259	33	48
Hackberry	50	23	26	1
Hickory	220	76	121	23
Hard maple	603	572	31	--
Soft maple	1,269	554	701	14
Red oak	4,306	2,918	1,362	26
White oak	2,595	1,447	1,013	135
Walnut	523	255	218	50
Willow	50	33	17	--
Other hardwoods	51	11	37	3
Total	13,584	7,467	5,460	657
All species	13,612	7,473	5,472	667

1/ Excludes removals for fuelwood and posts.

2/ Combined Northwest and Southwest Units.

Table 8.-- Timber removals from growing stock on timberland for fuelwood and posts by species group and Forest Survey Unit, Iowa, 1988

(In thousand cubic feet)

Species group	All Units	Northeast Unit	Southeast Unit	West 1/
SOFTWOODS				
Red pine	0	0	0	0
White pine	0	0	0	0
Redcedar	25	4	11	10
Total	25	4	11	10
HARDWOODS	0			
Ash	57	17	20	20
Aspen	0	0	0	0
Basswood	0	0	0	0
Birch	10	8	2	0
Black cherry	5	5	0	0
Cottonwood	54	8	7	39
Elm	132	68	16	48
Hackberry	0	0	0	0
Hickory	107	30	54	23
Hard maple	1	1	0	0
Soft maple	39	9	30	0
Red oak	158	78	77	3
White oak	451	158	162	131
Walnut	0	0	0	0
Willow	0	0	0	0
Other hardwoods	37	11	24	2
Total	1,051	393	392	266
All species	1,076	397	403	276

1/ *Combined Northwest and Southwest Units.*

Table 9.-- Timber removals from sawtimber on timberland for industrial roundwood by species group and Forest Survey Unit, Iowa, 1988 1/

(In thousand board feet) 2/

Species group	All Units	Northeast Unit	Southeast Unit	West 3/
SOFTWOODS				
Red pine	4	4	--	--
White pine	4	4	--	--
Redcedar	22	4	11	7
Total	30	12	11	7
HARDWOODS				
Ash	1,630	773	802	55
Aspen	27	27	--	--
Basswood	1,397	1,228	144	25
Birch	48	38	10	--
Black cherry	232	188	44	--
Cottonwood	13,944	3,854	9,301	789
Elm	1,275	965	138	172
Hackberry	194	93	98	3
Hickory	840	294	479	67
Hard maple	2,352	2,219	133	--
Soft maple	4,965	2,209	2,729	27
Red oak	15,793	10,677	5,021	95
White oak	9,137	5,213	3,655	269
Walnut	2,620	1,294	1,209	117
Willow	218	141	73	4
Other hardwoods	253	40	168	45
Total	54,925	29,253	24,004	1,668
All species	54,955	29,265	24,015	1,675

1/ Excludes removals for fuelwood and posts.

2/ International 1/4-inch rule.

3/ Combined Northwest and Southwest Units.

Table 10.--Sawlog production by species group and State of destination, Iowa, 1988

(In thousand board feet) 1/

ALL UNITS

Species group	All States	Iowa	Wisconsin	Minnesota	Other States
SOFTWOODS					
Red pine	4	4	--	--	--
White pine	4	4	--	--	--
Redcedar	10	10	--	--	--
Total	18	18	--	--	--
HARDWOODS					
Ash	1,867	1,703	161	--	3
Aspen	24	24	--	--	--
Basswood	1,724	1,427	290	--	7
Birch	10	10	--	--	--
Black cherry	252	252	--	--	--
Cottonwood	14,582	13,428	--	160	994
Elm	1,144	1,049	95	--	--
Hackberry	284	280	--	--	4
Hickory	432	407	25	--	--
Hard maple	3,275	2,825	450	--	--
Soft maple	5,077	5,071	6	--	--
Red oak	21,394	19,454	1,790	--	150
White oak	10,743	10,174	459	--	110
Walnut	3,649	3,539	38	--	72
Willow	7	7	--	--	--
Other hardwoods	83	77	--	--	6
Total	64,547	59,727	3,314	160	1,346
All species	64,565	59,745	3,314	160	1,346

NORTHEAST UNIT

SOFTWOODS					
Red pine	4	4	--	--	--
White pine	4	4	--	--	--
Redcedar	2	2	--	--	--
Total	10	10	--	--	--
HARDWOODS					
Ash	1,018	857	161	--	--
Aspen	24	24	--	--	--
Basswood	1,478	1,188	290	--	--
Birch	7	7	--	--	--
Black cherry	214	214	--	--	--
Cottonwood	3,022	3,022	--	--	--
Elm	1,061	966	95	--	--
Hackberry	136	136	--	--	--
Hickory	260	235	25	--	--
Hard maple	3,181	2,731	450	--	--
Soft maple	1,669	1,663	6	--	--
Red oak	14,671	12,881	1,790	--	--
White oak	6,614	6,155	459	--	--
Walnut	1,876	1,792	38	--	46
Willow	6	6	--	--	--
Total	35,237	31,877	3,314	--	46
All species	35,247	31,887	3,314	--	46

(Table 10 continued on next page)

(Table 10 continued)

SOUTHEAST UNIT

Species group	All States	Iowa	Wisconsin	Minnesota	Other States
SOFTWOODS					
Redcedar	8	8	--	--	--
Total	8	8	--	--	--
HARDWOODS					
Aspen	796	796	--	--	--
Basswood	211	211	--	--	--
Birch	3	3	--	--	--
Black cherry	38	38	--	--	--
Cottonwood	9,692	9,526	--	--	166
Elm	83	83	--	--	--
Hackberry	144	144	--	--	--
Hickory	172	172	--	--	--
Hard maple	94	94	--	--	--
Soft maple	3,326	3,326	--	--	--
Red oak	6,596	6,512	--	--	84
White oak	4,108	4,019	--	--	89
Walnut	1,288	1,262	--	--	26
Willow	1	1	--	--	--
Other hardwoods	77	77	--	--	--
Total	26,629	26,264	--	--	365
All species	26,637	26,272	--	--	365

NORTHWEST AND SOUTHWEST UNITS

Ash	53	50	--	--	3
Basswood	402	28	--	160	214
Cottonwood	1,501	880	--	--	621
Hackberry	4	--	--	--	4
Soft maple	82	82	--	--	--
Red oak	127	61	--	--	66
White oak	21	--	--	--	21
Walnut	485	485	--	--	--
Other hardwoods	6	--	--	--	6
All species	10,384	565	--	--	728

1/ International 1/4-inch rule.

Table 11.--Saw log receipts in Iowa by species group, area of origin, and Forest Survey Unit, 1988

(In thousand board feet) 1/

Species group	All States	Iowa	Illinois	Wisconsin	Minnesota	Missouri	Other States
			ALL UNITS				
SOFTWOODS							
Red pine	4	4	--	--	--	--	--
White pine	4	4	--	--	--	--	--
Redcedar	15	10	4	--	--	1	--
Total	23	18	4	--	--	1	--
HARDWOODS							
Ash	2,289	1,703	262	156	--	158	10
Aspen	24	24	--	--	--	--	--
Basswood	2,816	1,427	77	528	769	15	--
Birch	14	10	3	--	--	1	--
Black cherry	411	252	118	33	--	8	--
Cottonwood	15,097	13,428	316	129	1,074	150	--
Elm	1,162	1,049	96	10	--	7	--
Hackberry	323	280	33	--	--	10	--
Hickory	663	407	80	154	--	22	--
Hard maple	3,288	2,825	276	179	--	8	--
Soft maple	7,156	5,071	779	256	154	896	--
Red oak	26,879	19,454	2,818	2,319	1,680	597	11
White oak	15,011	10,174	2,098	1,123	1,059	557	--
Walnut	6,286	3,539	943	160	--	1,269	375
Willow	7	7	--	--	--	--	--
Other hardwoods	149	77	55	--	--	17	--
Total	81,579	59,727	7,954	5,047	4,736	3,715	400
All species	81,602	59,745	7,958	5,047	4,736	3,716	400

(Table 11 continued on next page)

(Table 11 continued)

NORTHEAST UNIT

Species group	All States	Iowa	Wisconsin	Illinois	Minnesota
SOFTWOODS					
Red pine	4	4	0	0	0
White pine	4	4	0	0	0
Redcedar	2	2	0	0	0
Total	10	10	0	0	0
HARDWOODS					
Ash	1,056	793	156	107	0
Aspen	24	24	0	0	0
Basswood	2,473	1,166	528	10	769
Birch	7	7	0	0	0
Black cherry	334	228	33	73	0
Cottonwood	3,428	2,887	129	28	384
Elm	1,005	920	10	75	0
Hackberry	165	165	0	0	0
Hickory	394	233	154	7	0
Hard maple	3,172	2,743	179	250	0
Soft maple	2,199	1,775	256	14	154
Red oak	21,849	15,718	2,319	2,132	1,680
White oak	10,299	6,850	1,123	1,267	1,059
Walnut	2,173	1,318	160	695	0
Willow	7	7	0	0	0
Total	48,585	34,834	5,047	4,658	4,046
All species	48,595	34,844	5,047	4,658	4,046

SOUTHEAST UNIT

Species group	All States	Iowa	Illinois	Missouri
SOFTWOODS				
Redcedar	13	8	4	1
Total	13	8	4	1
HARDWOODS				
Ash	873	670	145	58
Basswood	329	247	67	15
Birch	7	3	3	1
Black cherry	77	24	45	8
Cottonwood	9,377	8,939	288	150
Elm	132	104	21	7
Hackberry	158	115	33	10
Hickory	269	174	73	22
Hard maple	102	68	26	8
Soft maple	4,727	3,066	765	896
Red oak	4,610	3,432	681	497
White oak	4,521	3,133	831	557
Walnut	623	491	63	69
Other hardwoods	149	77	55	17
Total hardwoods	25,954	20,543	3,096	2,315
All species	25,967	20,551	3,100	2,316

(Table 11 continued on next page)

(Table 11 continued)

NORTHWEST AND SOUTHWEST UNIT

Species group	All States	Iowa	Missouri	Illinois	Nebraska	Kansas	Minnesota
Ash	360	240	100	10	5	5	--
Basswood	14	14	--	--	--	--	--
Cottonwood	2,292	1,602	--	--	--	--	690
Elm	25	25	--	--	--	--	--
Hard maple	14	14	--	--	--	--	--
Soft maple	350	230	100	5	10	5	--
Red oak	304	304	--	--	--	--	--
White oak	191	191	--	--	--	--	--
Walnut	3,490	1,730	1,200	185	185	190	--
Total	7,040	4,350	1,400	200	200	200	690

1/ International 1/4-inch rule.

Table 12.-- Lumber production by Forest Survey Unit for softwoods and hardwoods, Iowa, 1988

(In thousand board feet) 1/

Forest Survey Unit	Softwoods	Hardwoods	All species
Northeast	11	51,573	51,584
Southeast	14	25,949	25,963
West 2/	--	7,080	7,080
State total	25	84,602	84,627

1/ International 1/4-inch rule.

2/ Combined Northwest and Soutwest Units.

Table 13.-- Veneer log production by species group and State of destination, Iowa, 1988

(In thousand board feet) 1/

Species group	Total	Iowa	Indiana	Wisconsin	Missouri	Other States
Aspen	10	--	--	10	--	--
Basswood	208	--	--	208	--	--
Black cherry	3	--	3	0	--	--
Cottonwood	27	--	--	27	--	--
Elm	8	--	--	--	--	8
Soft maple	572	--	--	572	--	--
Red oak	383	--	151	226	--	6
White oak	245	--	192	2	--	51
Walnut	1,185	376	575	--	160	74
Willow	59	--	--	--	59	--
All species	2,700	376	921	1,045	219	139

1/ International 1/4-inch rule.

Table 14.-- Post production by species group and Forest Survey Unit, Iowa, 1988

(In thousand pieces)

Species group	All Units	Northeast Unit	West 1/
Redcedar	90	18	72
Hickory	63	22	41
Red oak	54	26	28
White oak	136	42	94
Walnut	5	3	2
Other hardwoods	5	1	4
All species	353	112	241

1/ *Combined Northwest and Southwest Units.*

Table 15.-- Logging residue by species group and Forest Survey Unit, Iowa, 1988 1/

(In thousand cubic feet)

Species group	All Units	Northeast Unit	Southeast Unit	West 2/
SOFTWOODS				
Red pine	--	--	--	--
White pine	--	--	--	--
Redcedar	1	--	1	--
Total	1	--	1	--
HARDWOODS				
Ash	301	164	130	7
Aspen	4	4	--	--
Basswood	274	240	29	5
Birch	--	--	--	--
Black cherry	38	33	5	--
Cottonwood	1,332	284	880	168
Elm	182	169	13	--
Hackberry	40	19	21	--
Hickory	71	42	29	--
Hard maple	522	506	16	--
Soft maple	836	285	539	12
Red oak	2,611	1,794	804	13
White oak	1,318	810	506	2
Walnut	212	110	76	26
Willow	3	2	1	--
Other hardwoods	13	--	13	--
Total	7,757	4,462	3,062	233
All species	7,758	4,462	3,063	233

1/ *Includes nongrowing-stock material such as usable limbwood and stem tips.*

2/ *Combined Northwest and Southwest Units.*

Table 16.-- Residue produced at primary wood-using mills by type of material, by type of use, and Forest Survey Unit, Iowa, 1988

(In thousand tons green weight)

NORTHEAST UNIT

Unit and type of use	Wood residue						Bark	
	Total		Coarse 1/		Fine 2/			
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
All counties								
Fiber products	--	12	--	10	--	2	--	--
Industrial fuel	--	10	--	3	--	7	--	--
Domestic fuel	--	28	--	27	--	1	--	5
Miscellaneous 3/	--	39	--	16	--	23	--	19
Not used	--	13	--	10	--	3	--	4
Total	--	102	--	66	--	37	--	28

SOUTHEAST UNIT

All counties								
Fiber products	--	8	--	8	--	--	--	1
Industrial fuel	--	3	--	3	--	--	--	--
Domestic fuel	--	3	--	3	--	--	--	1
Miscellaneous 3/	--	25	--	14	--	11	--	5
Not used	--	16	--	6	--	9	--	7
Total	--	55	--	35	--	20	--	15

NORTHWEST AND SOUTHWEST UNIT

All counties								
Domestic fuel	--	3	--	3	--	--	--	1
Miscellaneous 3/	--	11	--	6	--	5	--	2
Not used	--	--	--	--	--	--	--	1
Total	--	14	--	9	--	5	--	4

ALL UNITS

All counties								
Fiber products	--	20	--	18	--	2	--	1
Industrial fuel	--	13	--	6	--	7	--	--
Domestic fuel	--	34	--	33	--	1	--	8
Miscellaneous 3/	--	76	--	36	--	40	--	27
Not used	--	29	--	17	--	13	--	12
Total	--	172	--	110	--	62	--	47

1/ Suitable for chipping such as slabs,edgings,veneer cores,etc.

2/ Not suitable for chipping such as sawdust,veneer clippings,etc.

3/ Livestock bedding, mulch, small dimension, and specialty items.

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Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.